1,065,095

# PATENT SPECIFICATION

DRAWINGS ATTACHED

1,065,095

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Int. Cl.:—B 23 b

## COMPLETE SPECIFICATION

## Chuck for Bevel Gears

I, KURT GRAF BLUCHER VON WAHLSTATT of German Nationality, of Frankfurter Ring 227, Munich 23, Germany, trading as Bayerisches Geichtmetallwerk Kommandit Gesellschaft, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a chuck for bevel gears for treating areas of the gear blank which are concentric with the teeth.

In bevel gears finished by precision forging processes, for example, in bevel gears used in differential gear of motor vehicles, the machining of the remaining gear blank, and particularly of the axial bore and the end face required for accurate lateral seating of the gear, is carried out after completed forging of the teeth. These surface areas are of importance to the functioning of the gear, and thus have to run accurately with respect to the teeth. The front cone of the forged teeth, however, being of no importance to the actual functioning of the gear, does not always satisfy the requirements made with regard to tolerance.

According to the invention there is provided a chuck for holding a bevel gear comprising a receiving member having counter-teeth for receiving the gear teeth of the bevel gear, and clamping means for holding the bevel gear in contact with the receiving member, including at least three clamping levers pivotally secured to a common adjusting member, the adjusting member being movable axially of the chuck, axial movement of the adjusting member in one direction causing the clamping levers to move radially inwards to engage the bevel gear.

The bevel gear to be machined in the chuck, which is usually a rotary chuck, is clamped concentrically in position by resiliently adjustable means by which the gear is pressed firmly into the counter-teeth, but which, owing to being resiliently adjustable, do not obstruct the accurate contact of the gear with the counter-teeth. Thus the bevel gear to be machined assumes its position in the rotary chuck in dependence upon the flanks of the finished teeth alone, so that the parts of the gear blank machined with the aid of the rotary chuck according to the invention run accurately with respect to the teeth. The construction of counter teeth of the rotary chuck is such that it is only the flanks of the teeth, and not the top and bottom cones of the bevel gear to be machined, which are contacted. The counter teeth may have plane contact areas which contact the teeth received preferably at a mid position, that is in the zone of the pitch circle.

The bevel gear may be held in position in the counter teeth of the rotary chuck by three or more clamping levers engaging radially inwards across the bevel gear and connected to a known clamping device, preferably an hydraulic clamping device by a common adjusting member. It will be understood that the movement of the connecting rod may also be produced mechanically. The clamping device may be provided with a concentric connecting rod of the usual construction having a spherical surface at its end. The spherical surface ensures that the adjusting member is movably supported, so that the clamping levers can adjust themselves to the gear to be clamped in position, and do not interfere with its accurate adjustment to the counter teeth. It is also possible, for example, to obtain adjustment of the clamping levers by resilient connecting links.

One end of the clamping levers is hinged to the adjusting member, the free ends of the levers carrying the clamping surfaces by

[*Price* 4*s.* 6*d.*]

which the gear is held in position. The clamping levers may be in communication with the housing of the rotary chuck through inclined surfaces which, during the axial clamping movement, produce an additional radial movement in known manner. The insertion and withdrawal of the bevel gear to be machined are thus substantially facilitated. The inclined surfaces by which this radial movement is produced, may also be provided on the clamping levers proper, but they may also be provided, for example, in the form of a conical surface, within the housing.

It will be understood that there are other possibilities of clamping the bevel gear in position in the rotary chuck according to the invention.

One embodiment of the invention is diagrammatically illustrated by way of example in the accompanying drawings, in which:—

Figure 1 is a longitudinal section of the rotary chuck according to the invention;

Figure 2 is a view looking in the axial direction from the receiving end;

Figure 3 shows a tooth receiver viewed in the axial direction, and

Figure 4 is a sectional elevation of a tooth receiver with a tooth inserted therein.

Referring to Figures 1 to 3 there is shown a rotary chuck according to the invention, in which the housing is denoted by the reference numeral 1. The housing 1 contains a receiving member 2 which carries a counter toothed member 3. Accurate running of the receiving member 2 may be obtained by adjusting screws 4. The bevel gear 5 to be machined is held in position in the receiving member 2 by clamping levers 6. The clamping levers 6 are pivotally mounted on a common adjusting member 7 which bears against the spherical surface 9 of a supporting member 8. The supporting member 8 is screwed to a connecting rod 10, and, for this purpose, is provided with an internal hexagonal part 11 to enable a box spanner to be introduced. The connecting rod 10 may be connected to a conventional clamping device consisting, for example, of an hydraulic cylinder extending coaxially with the spindle. Screws 12 may be provided by which the rotary receiver is secured to the face plate of the machine tool.

The clamping levers 6 have inclined surfaces 13 which, when the connecting rod 10 moves to the right, permit the clamping lever to swing outwards under the action of a pressure spring 14.

Figure 4 shows, on an enlarged scale, one individual counter tooth 15, in which one tooth 16 of a bevel gear engages. The areas of contact of the counter teeth 15 are constructed as plane surfaces which bear solely against the middle part of the tooth received therein.

WHAT I CLAIM IS:—

1. A chuck for holding a bevel gear comprising a receiving member having counter-teeth for receiving the gear teeth of the bevel gear, and clamping means for holding the bevel gear in contact with the receiving member, including at least three clamping levers pivotally secured to a common adjusting member, the adjusting member being movable axially of the chuck, axial movement of the adjusting member in one direction causing the clamping levers to move radially inwards to engage the bevel gear.

2. A chuck according to claim 1, in which the counter-teeth of the receiving member have plane flanks.

3. A chuck according to claim 1 or claim 2, including resilient means constantly urging the clamping levers outwards.

4. A chuck according to claim 3, in which the adjusting member is in contact with the spherical surface of a supporting member secured to the end of a connecting rod of a clamping device, the spherical surface being concentric with the connecting rod.

5. A chuck according to any one of claims 1 to 4, including a chuck housing for supporting the receiving member, the clamping levers being provided with inclined surfaces which bear against the chuck housing.

6. A rotary chuck, substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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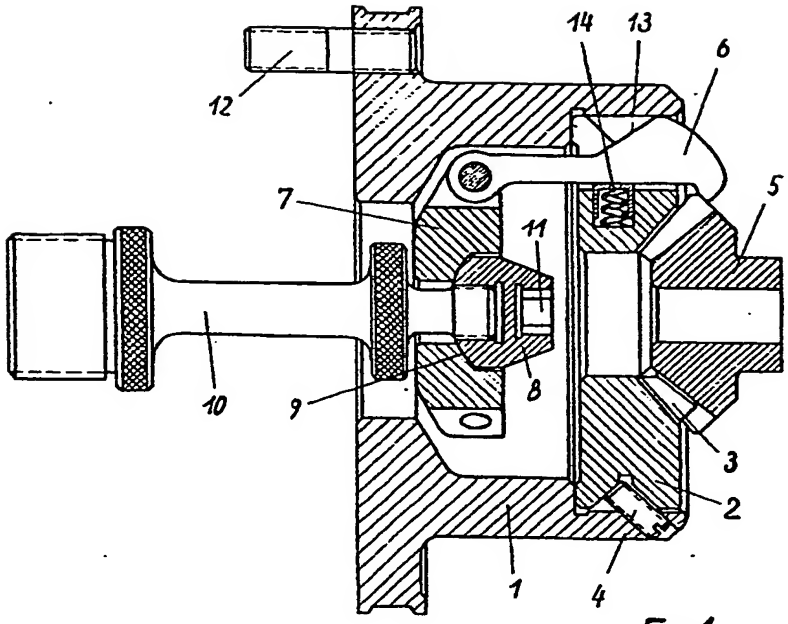


Fig. 1

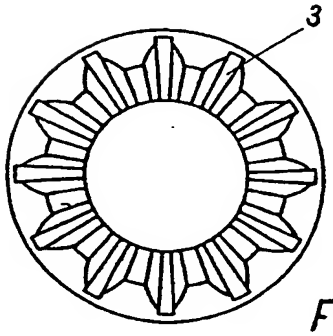


Fig. 3

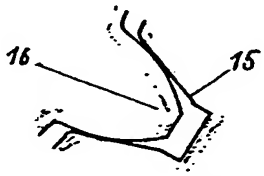


Fig. 4

1065095 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 1 & 2

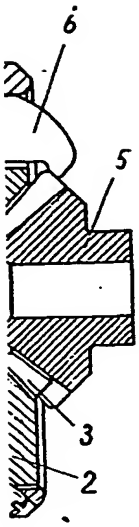


Fig.1

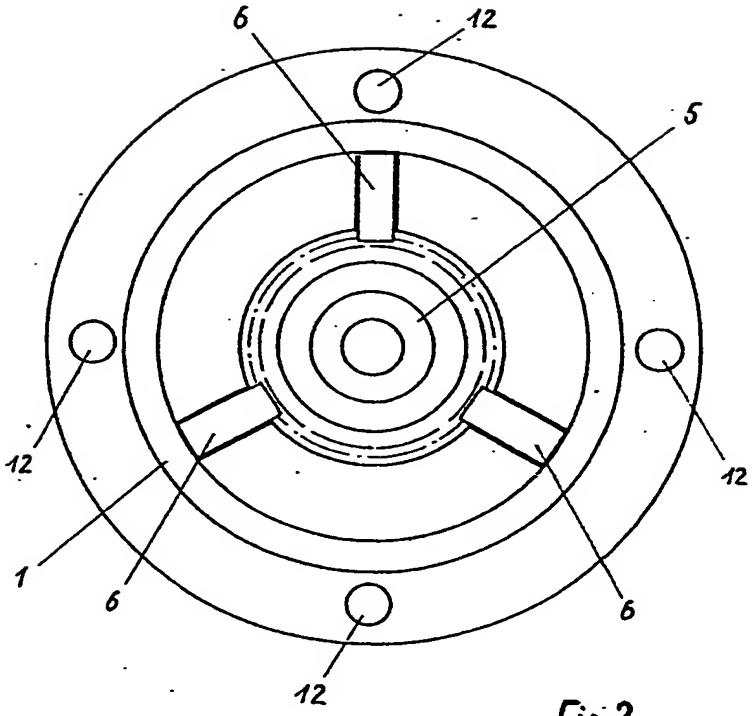


Fig.2

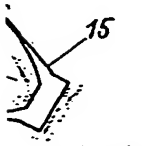


Fig.4

1065095 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 1 & 2

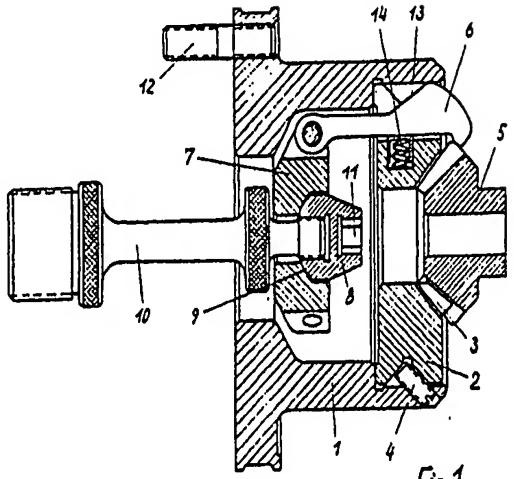


Fig. 1

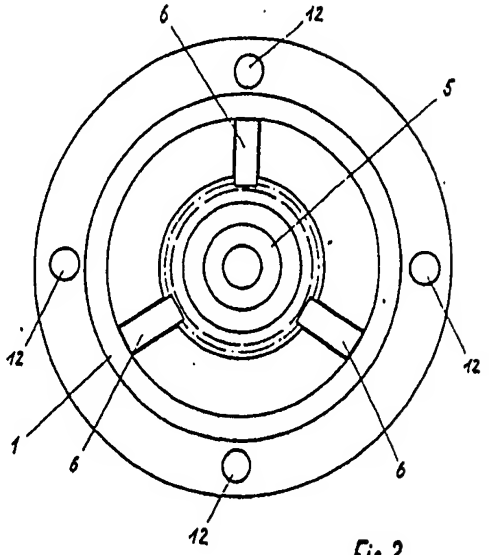


Fig. 2

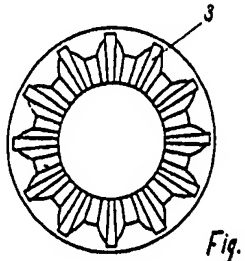


Fig. 3


Fig. 4